

The first record of *Gobichelifer chelanops* (Pseudoscorpiones: Cheliferidae) from Iran

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Abstract — *Gobichelifer chelanops* Redikorzev is widely distributed throughout Central Asia. We report on new specimens attributed to this species collected from tree bark habitats in Iran.

Key words — Arachnida, Pseudoscorpiones, Cheliferidae, *Gobichelifer chelanops*, Iran, Kerman Province, biogeography

Introduction

Pseudoscorpions are small, yet abundant Arachnids found in most terrestrial ecosystems of the world. The first pseudoscorpion reported from Iran, *Chelifer spinipalpis* Redikorzev 1918, now placed in the genus *Strobilochelifer*, was described from Bazman, south-eastern Iran (Redikorzev 1918).

The most substantial contributions were made by Beier (1951, 1971). There are currently nine families, 21 genera and 39 species known from the country (Harvey 2011).

As part of a research program investigating the pseudoscorpion fauna of the region, we found specimens attributable to the cheliferid genus *Gobichelifer* Krumpál 1979. Although this genus is known from Central Asia and Mongolia (Krumpál 1979, Dashdamirov & Schawaller 1995, Harvey 2011), there are no previous records from Iran. This paper is the result of our study on these specimens.

Methods

The material used in this study was collected from various geographical parts of Kerman Province, south-eastern Iran. The specimens were collected directly from under tree bark by using thin needles or extracted with Berlese funnels.

All specimens were preserved in 70% ethanol and were prepared for study as follows. The pedipalps, chelicera, first and fourth legs were dissected using thin needles, cleared with 60% lactic acid, and mounted on glass microscope slides in Hoyer's medium (a mixture of distilled water, chloral hydrate, Arabic gum and glycerin). The duration of the clearing phase was dependent on the degree of sclerotization of the body. The specimens were examined and illustrated with an Olympus BH-2 compound microscope and drawing tube attachment. The specimens are lodged in Collection of the Acarology Laboratory, Shahid Bahonar University of

Kerman, Iran.

Morphological terminology follows Chamberlin (1931), Harvey (1992) and Judson (2007). The following trichobothrial abbreviations were employed: *b*=basal; *eb*=external basal; *esb*=external sub-basal; *ib*=internal basal; *isb*=internal sub-basal; *ist*=internal sub-terminal; *est*=external sub-terminal; *it*=internal terminal; *et*=external terminal; *t*=terminal; *sb*=sub-basal; *st*=sub-terminal. In addition, the following abbreviations are used: mm=millimeter; L= length; W=width; H=height.

Family Cheliferidae

Genus *Gobichelifer* Krumpál 1979

Gobichelifer chelanops (Redikorzev 1922)

Chelifer chelanops Redikorzev 1922: 267–270, figs. 9–11; Caporiacco 1935: 243.

Chelifer semenovi Redikorzev 1934: 430–432, figs. 8–10; Roewer 1936: fig. 66d (synonymized by Schawaller 1989: 26).

Gobichelifer dashdorzi Krumpál 1979: 668–671, figs. 1–12; Okali 1988: 255 (synonymized by Schawaller 1986: 11).

Gobichelifer semenovi (Redikorzev): Schawaller 1986: 11–12, figs. 29–30; Beron 2002: 37.

Gobichelifer chelanops (Redikorzev): Schawaller 1989: 26, figs. 57–62; Harvey 1991: 502; Dashdamirov & Schawaller 1995: 21–23, figs. 22–24, 87–90; Schawaller 1995: 126; Beron 2000: 173; Beron 2002: 39.

Material examined. Iran: *Kerman Province*: 35♂, 50♀, 30°20'44"N, 57°27'46"E; 13♂, 18♀, 28°52'45"N, 56°23'56"E; 0♂, 5♀, 30°09'20"N, 57°24'17"E; 2♂, 5♀, 30°04'38"N, 56°39'25"E; 8♂, 25♀, 31°33'12"N, 55°39'39"E.

Description. **Male.** *Body length*: 3.35–4.2 mm.

Carapace: dark brown to red; granulated with uniform granules; slightly longer than wide; L/W 1.00–1.10; with 2

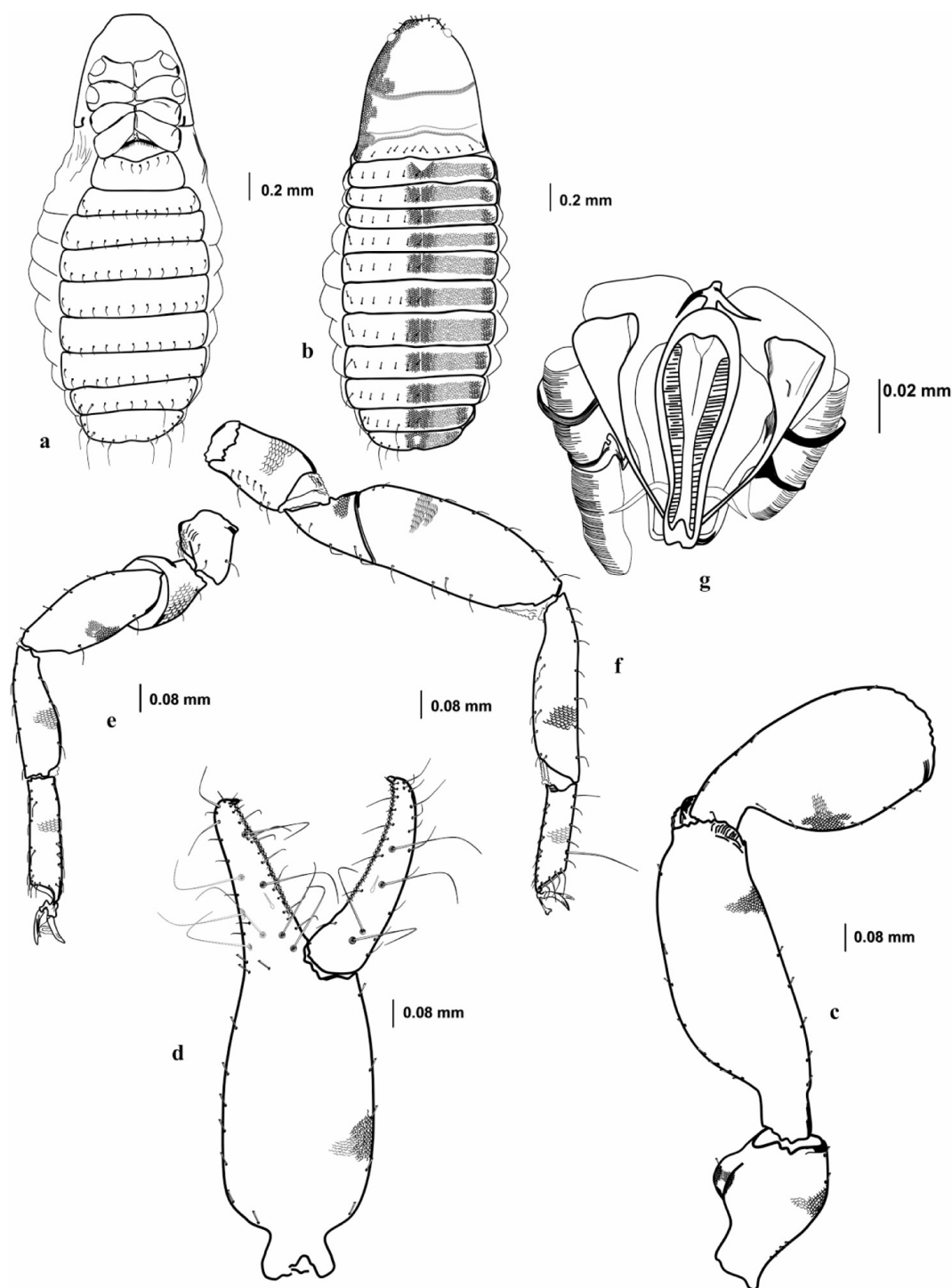


Fig. 1. *Gobichelifer chelanops*, male from Iran: a, body, ventral side; b, same, dorsal side; c, left pedipalp; d, right chela; e, leg I; f, leg IV; g, genital organ.

small corneal eyes; setae short with terminal denticulations; anterior margin with 6 and posterior margin with 13 setae; anterior margin with 2 very short setae in front of each eye and 4 long setae on border; 2 transverse furrow present (Fig. 1b), anterior furrow distinct, U-shaped and situated medially, narrow and extending to lateral margins; posterior furrow wider, shorter and straight.

Abdomen: with 11 segments.

Tergites (Fig. 1b): sclerotized and granulate; dark cream with 2 dark brown and extensive stripes, each half-tergite with a darker spot medially; tergites with setae arranged: 12: 11: 13: 15: 14: 13: 15: 14: 13: 13: 12; most setae short with terminal denticulations; tergites I to III with serial setae (in one row), tergites IV to XI with one lateral seta on each

half-tergite, tergites VIII–IX with longer lateral setae, tergite X with 2 long and simple setae on each half-tergite, longer seta situated medially, tergite XI with 6–8 simple setae, longest seta situated media-laterally; tergite I not divided, tergite II divided incompletely, tergite III to X divided completely, tergite XI not divided.

Sternites (Fig. 1a): with 10 segments; sternite I absent; sternites II–III deform and shaped anterior operculum and posterior operculum, anterior operculum with 34–35 and posterior operculum with 6–8 simple setae; sternites IV to X divided by narrow median line; sternite XI divided incompletely; sternal setae simple, narrow and slightly longer than tergal setae, sternite X with 2 simple and long setae on each half-sternite, longer seta situated medially, sternite XI with 4 pseudo-tactile and 2 tactile setae, shorter setae situated laterally, sternal setae arranged: 34: (0)6(0): (1)10(1): 11: 13: 12: 11: 13: 14: 10.

Pleurites: striated.

Chelicera: brown; galeal seta present; galea short with 2–3 terminal short rami; hand with 5 simple setae, basal and sub-basal setae shorter; fixed finger with 5 teeth, 2 terminal teeth small and 3 basal teeth large; rallum with 3 blades, distal blade longest with lateral denticulations; serrula exterior with 17–21 blades.

Pedipalp (Fig. 1c, d): dark red, darker than carapace; trochanter, femur, patella and chelal hand granulate; trochanter with 2 distinct dorsal ridges; trochanter L/W 1.50–1.76; femur with distinct pedicel; retrolateral margin of femur curved posteriorly and prolateral margin straight with terminal pit; femur L/W 2.50–2.68; patella shaped like a club, with curved, distinct and narrow pedicel; retro lateral margin of patella slightly curved posteriorly and prolateral margin obviously curved anteriorly; patella L/W 2.02–2.08; chela stout and granulated with uniform granules; chela with distinct and moderate pedicel; chela (with pedicel) L/W 2.92–3.05; chela (without pedicel) L/W 2.66–2.77; movable finger shorter than hand with pedicel, hand 1.33–1.40 longer than movable finger; fixed finger with 8 and movable finger with 4 trichobothria; fixed finger with trichobothrium *ist* situated posterior and *it* anterior to *est*, *eb-esb-ib-isb* aggregated basally; movable finger with trichobothrium *st* situated between *t* and *sb*, *sb* situated close to *b*; fixed finger with 31–32 and movable finger with 31–32 teeth; nodus ramosus long and present in both fingers, situated between *sb* and *st* in movable finger and between *est* and *et* in fixed finger.

Leg I (Fig. 1e): stout and lighter in color than carapace; trochanter L/W 1.09–1.20; femur L/W 1.54–1.66; patella granulate laterally, L/W 2.47–2.63; tibia L/W 2.93–3.26; tarsus apparently shorter and narrower than tibia, terminal margin concave; L/W 3.36–3.54; basal setae short with terminal denticulations, sub-terminal setae simple; claws asymmetric, narrower claw with median accessory tooth; arolium short and wide.

Leg IV (Fig. 1f): very stout; lighter in color than carapace; coxa without coxal sac; trochanter L/W 1.30–1.60;

femur L/W 1.45–1.68; patella wide and slightly granulate laterally, L/W 2.36–2.73; tibia slightly shorter than patella, prolateral margin curved anteriorly, L/W 3.73–4.11; tarsus apparently shorter than tibia, with 1 tactile setae posteriorly and 1 pseudo-tactile seta anteriorly, L/W 3.57–3.81; sub-terminal setae simple; claws symmetric and without accessory teeth; arolium short and wide.

Dimensions (L/W, in mm): *Body*: L 3.47. *Carapace*: 1.08/1.08. *Chelicera*: movable finger L 0.23. *Pedipalp*: trochanter 0.61/0.37; femur 1.10/0.41; patella 0.95/0.47; chela (with pedicel) 1.65/0.54; chela (without pedicel) L 1.50; hand L 1.00; movable finger L 0.75. *Leg I*: trochanter 0.21/0.18; femur 0.35/0.21; patella 0.53/0.20; tibia 0.46/0.15; tarsus 0.39/0.11. *Leg IV*: trochanter 0.31/0.22; femur 0.34/0.21; patella 0.78/0.32; tibia 0.75/0.19; tarsus 0.42/0.11.

Female. *Body length*: 4.40–5.05 mm.

Carapace: brown to dark brown, distance between furrows darker and posterior margin lighter in color; granulated with uniform granules; longer than wide; L/W 1.08–1.09; with 2 small corneal eyes; setae short with terminal denticulations; anterior margin with 8 and posterior margin with 11 setae; anterior margin with 2 very short setae in front of each eye and 6 long setae on border; 2 transverse furrow present (Fig. 2b), anterior furrow distinct and U-shaped, situated medially, narrow and extending to lateral margins; posterior furrow wider, shorter and straight.

Abdomen: with 11 segments.

Tergites (Fig. 2b): slightly sclerotized and granulate; cream with 2 brown or light brown and extensive stripes, each half-tergite with a darker spot medially; tergites with setae arranged: 13: 12: 12: 14: 14: 12: 15: 14: 12: 12: 12. most setae short with terminal denticulations; tergites I to II with serial setae (in one row), tergites III to XI with one lateral seta on each half-tergite, tergites VIII–IX with longer lateral setae, tergite X with 1 long and simple seta laterally on each half-tergite, tergite XI with 2 simple setae situated media-laterally; tergite I not divided, tergite II divided incompletely, tergite III to X divided completely, tergite XI not divided.

Sternites (Fig. 2A): with 10 segments; sternite I absent; sternites II–III deform and shaped anterior operculum and posterior operculum, anterior operculum with 21 and posterior operculum with 8 simple setae; pair genital cribriform plates present (Fig. 2c); sternites IV to X divided by narrow median line; sternite XI divided incompletely; sternal setae simple, narrow and slightly longer than tergal setae, sternite X and XI with 1 simple and long seta situated laterally on each half-sternite, sternal setae arranged: 21: (0)8(0): (1)8(1): 12: 12: 12: 13: 14: 13: 12.

Pleurites: striated.

Chelicera: brown; movable finger darker; galeal seta present; galea short with 4 terminal rami; hand with 5 simple setae, basal and sub-basal setae shorter; fixed finger with 5 teeth, 2 terminal teeth small and 3 basal teeth large; rallum with 3 blades, distal blade longest with lateral denticula-

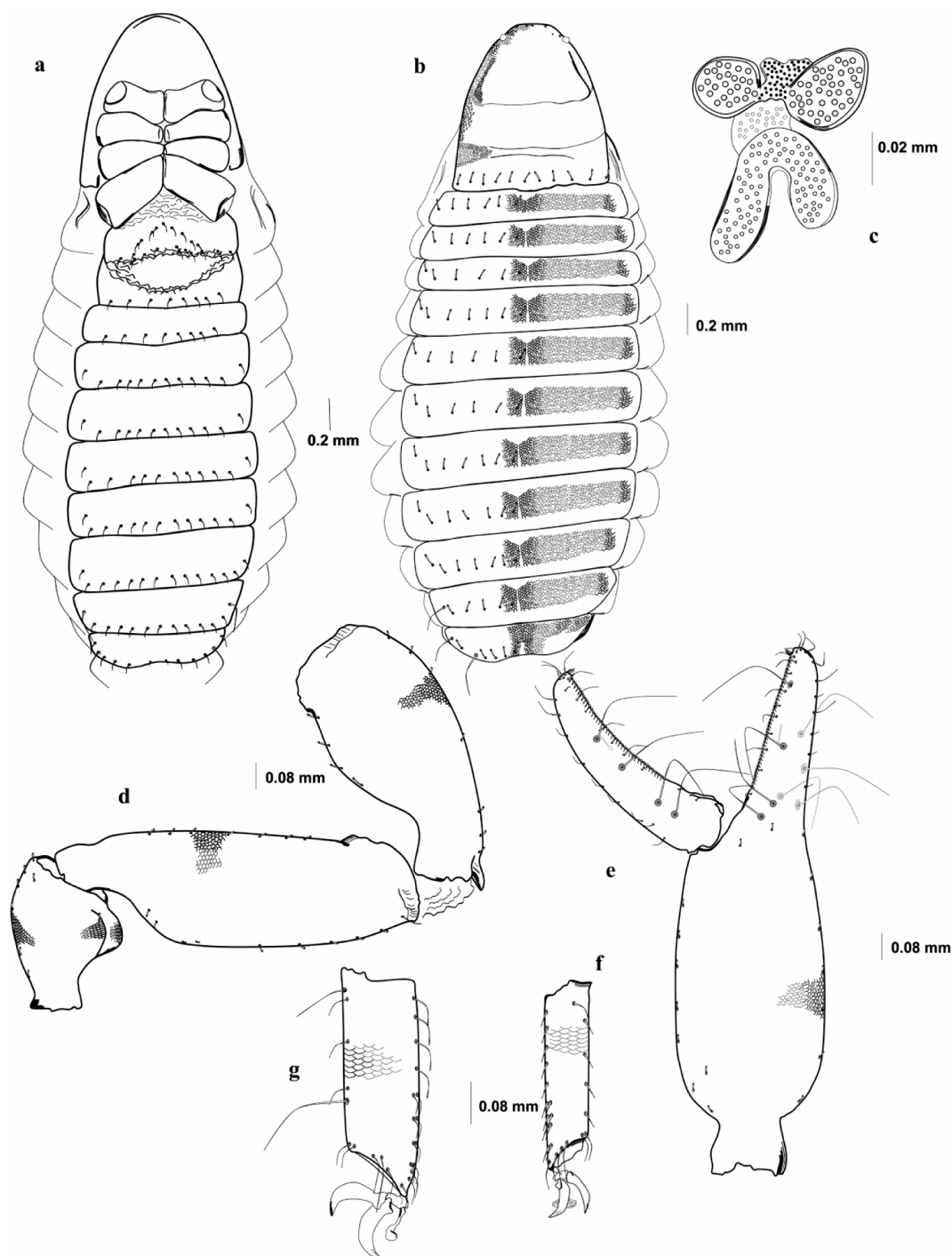


Fig. 2. *Gobichelifer chelanops*, female: a, body, ventral side; b, same, dorsal side; c, genital organ; d, right pedipalp; e, left chela; f, tarsus of leg I; g, tarsus of leg IV.

tions; serrula exterior with 20 blades.

Pedipalp (Fig. 2d, e): red, lateral margin black and very darker than carapace; trochanter, femur, patella and chelal hand granulate; trochanter with 2 distinct dorsal ridges; trochanter L/W 1.62–1.71; femur with distinct pedicel; retrolateral margin of femur curved posteriorly and prolateral margin straight with terminal pit; femur L/W 2.49–2.87; patella shaped like a club, with curved, distinct

and narrow pedicel; retrolateral margin of patella slightly curved posteriorly and prolateral margin obviously curved anteriorly; patella L/W 2.00–2.25; chela stout and granulated with uniform granules; chela with distinct and moderate pedicel; chela (with pedicel) L/W 3.21–3.27; chela (without pedicel) L/W 2.94; movable finger shorter than hand with pedicel, hand 1.34–1.37 longer than movable finger; fixed finger with 8 and movable finger with 4

trichobothria; fixed finger with trichobothrium *ist* situated posterior and *it* anterior to *est*, *it* situated close to *ist* than *et*, *eb-esb-ib-isb* aggregated basally; movable finger with trichobothrium *st* situated close to *t* than *sb*, *sb* situated close to *b*; fixed finger with 30–34 and movable finger with 30–34 teeth; nodus ramosus long and present in both fingers, situated between *sb* and *st* in movable finger and between *est* and *it* in fixed finger.

Leg I: stout and lighter in color than carapace; trochanter L/W 1.15; femur L/W 1.54–1.58; patella granulate laterally, L/W 2.5–3.09; tibia granulate laterally, L/W 3.20–3.57; tarsus (Fig. 2f) shorter and narrower than tibia, terminal margin concave; L/W 4.00–4.20; basal setae short with terminal denticulations, sub-terminal setae simple; claws symmetric, without accessory teeth; arolium short and slightly narrow.

Leg IV: very stout; lighter in color than carapace; coxa without coxal sac; trochanter L/W 1.21; femur L/W 1.42–1.60; patella wide and slightly granulate laterally, L/W 2.36–2.67; tibia slightly shorter than patella, prolateral margin curved anteriorly, L/W 4.05; tarsus (Fig. 2g) apparently shorter and narrower than tibia, with 1 tactile setae posteriorly and 1 pseudo-tactile seta anteriorly, L/W 3.84–3.92; sub-terminal setae simple; claws symmetric and without accessory teeth; arolium short and narrow.

Dimensions (L/W, in mm): *Body*: L 4.40. *Carapace*: 1.25/1.15. *Chelicera*: movable finger L 0.26. *Pedipalp*: trochanter 0.57/0.35; femur 1.15/0.40; patella 0.99/0.44; chela (with pedicel) 1.80/0.56; chela (without pedicel) L 1.62; hand L 1.07; movable finger L 0.80. *Leg I*: trochanter 0.23/0.20; femur 0.37/0.24; patella 0.65/0.21; tibia 0.48/0.15; tarsus 0.42/0.10. *Leg IV*: trochanter 0.34/0.28; femur 0.37/0.26; patella 0.92/0.39; tibia 0.81/0.20; tarsus 0.51/0.13.

Discussion

The genus *Gobichelifer* resembles the genus *Rhacochelifer* in many ways including the stout pedipalpal segments, but *Gobichelifer* is easily distinguished by the absence of coxal sac in males (Krumpál 1979, see also Fig. 1a). Both genera are members of the tribe Dactylochelifnerini (Beier 1932).

Gobichelifer currently includes a single species, *G. chelanops* (Redikorzev 1922) (type locality Sussa-myr River, Kirghiz Range, Kyrgyzstan), and two junior synonyms, *Chelifer semenovi* Redikorzev 1934 (type locality Sutushar Uzbekistan), and *G. dashdorzi* Krumpál 1979 (type locality Oasis Echiin gol, Mongolia). The synonymies were suggested by Schwaller (1986, 1989). *Gobichelifer chelanops* has also been reported from Pakistan, Uzbekistan and Tajikistan (Dashdamirov & Schawaller 1995, Harvey 2011). The newly collected specimens from Iran display some differences to previously recorded material. They are slightly smaller, for example the pedipalpal femur is 1.10/0.41 (♂), 1.15/0.40 mm (♀), and the chela (with pedicel) is 1.65/0.54 (♂), 1.80/0.56 (♀).

The femur of *Gobichelifer dashdorzi* is 1.26–1.31/0.36–

0.39 (♂), 1.25–1.46 mm (♀) and the chela (with pedicel) is 1.92–2.01/0.59–0.63 (♂), 2.03–2.15/0.62–0.65 mm (♀) (Krumpál 1979). The femur of *Gobichelifer chelanops* is 1.29/0.58 mm (♂), and chela is 1.89/0.64 mm (♂) (Dashdamirov & Schawaller 1995).

The femur of *G. dashdorzi* is more slender [$3.37 \times$ as long as wide (♂), $3.23\text{--}3.28 \times$ (♀)] than *G. chelanops* [$2.22 \times$ (♂)] or the Iranian specimens [$2.50\text{--}2.68 \times$ (♂), $2.49\text{--}2.87 \times$ (♀)]. Similar discrepancies can be observed in the other pedipalpal segments (Krumpál 1979, Dashdamirov & Schawaller 1995).

Another observable difference is the ratio of male tarsus I. Tarsus I of *G. dashdorzi* is thinner ($4.67\text{--}5.25 \times$), while *G. chelanops* is thicker ($3.00 \times$) and the Iranian specimens are intermediate ($3.36\text{--}3.54 \times$). Despite some observable differences between the Iranian populations and those from Central Asia and Mongolia, there is little evidence that they represent different species. We therefore attribute the Iranian material to *G. chelanops* with represents the first record of genus *Gobichelifer* from Iran.

The specimens were found living gregariously under the bark of various different tree species where they produced silk chambers. *Gobichelifer chelanops* has also been found under tree bark, including *Populus* (Krumpál 1979), and *Ulmus*, *Salix*, *Juglans* and *Juniperus* (Dashdamirov & Schawaller 1995). The Iranian specimens were collected from the under bark of *Elaeagnus* and *Platus* trees.

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